Housatonic River Human Health Risk Assessment

Housatonic River Initiative

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Environmental Stewardship Concepts

Richmond VA Nov 18, 2003

Issues raised

- General Comments
- Specific topics:
    - exposure
    - toxicity
    - risk estimates
- Uncertainties, omissions, limitations
- Conclusions

General Comments

- Relies on a wealth of previous information to estimate health risks
- Well written, easy to understand and follow.
- Uses standard EPA practices and guidelines
- Uses more recent techniques for quantitatively evaluating risks
- The HHRA concludes the contaminants in the Housatonic River pose an unacceptable risk to human health
- Schaghticoke Tribe not addressed in the RA

Exposure issues

- Sediment levels in CT are not evaluated sufficiently
- CT floodplain is discounted
- Sediment volume and depth is not considered in CT
- Fetal and young children exposures
- Body burdens are higher in the Housatonic region and need to be included in the dose estimates
- Inhalation exposure is largely discounted

Fish consumption: Subsistence Fishing

- Estimates of consumption, types of food consumed, cooking methods, persons affected, and justice issues.
- No estimates examine the consumption of plants
- No data on other terrestrial animals living in the watershed:
  - Squirrels, raccoon, pheasant, bear, etc.
- Estimates do not include:
  - Catfish, carp, eel, turtles, only minor consideration for amphibians (frogs) consumption

Phase II fish/waterfowl

- Higher fish consumption rates need to be included to reflect future uses
- Subsistence fishers and hunters use the river and also collect plants
- Tribal consumption is not included at all
- Limited data on waterfowl and other non-fish wildlife consumption
- Carp are not addressed

CT Sediments

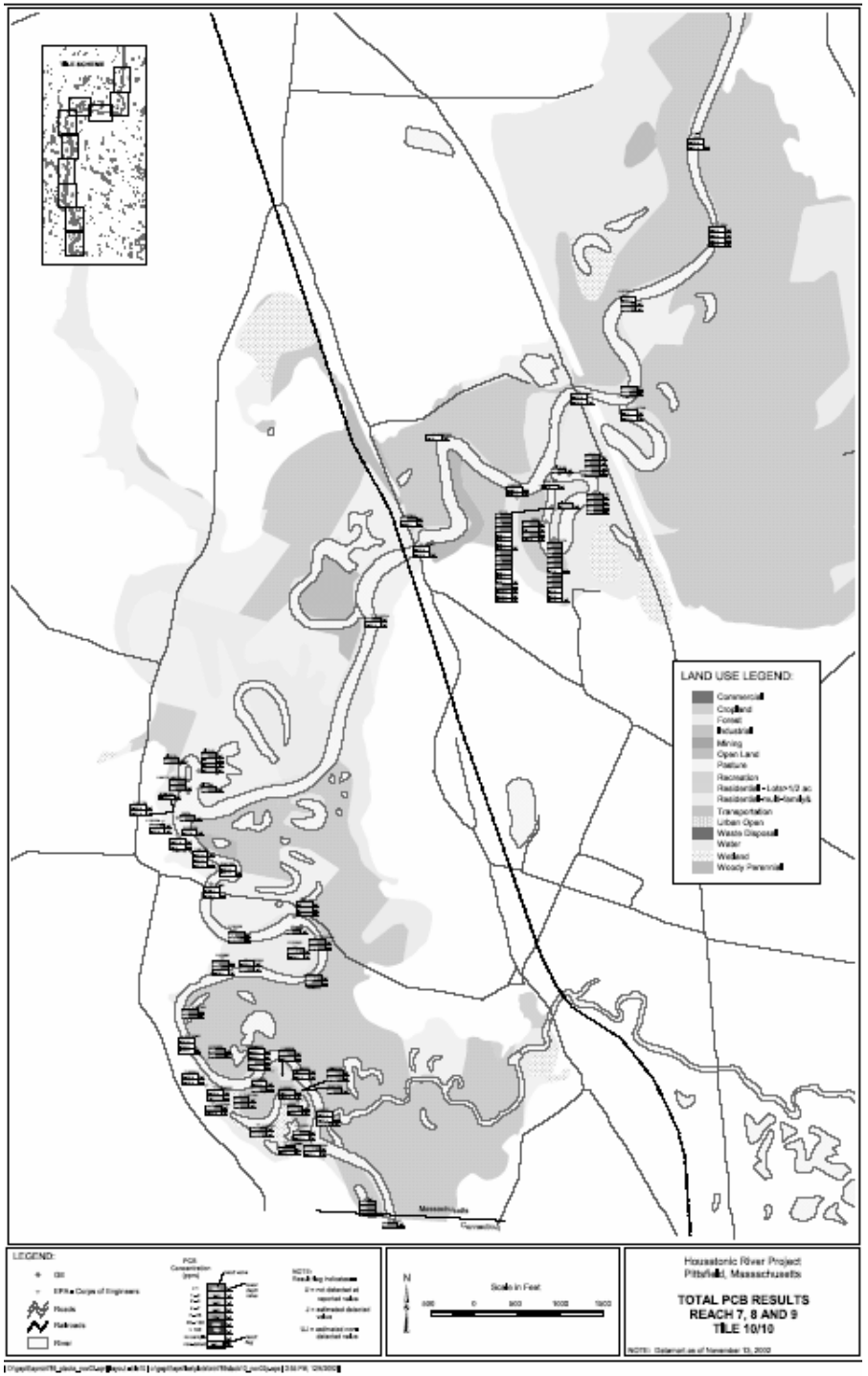
- The sediment sampling effort was focused on MA; little sampling in CT.
- The majority of the data (from sediment samples) are from historical samples, obtained by GE, not an independent contractor, and not by EPA or EPA contractor.

Housatonic River Watershed – MA and CT

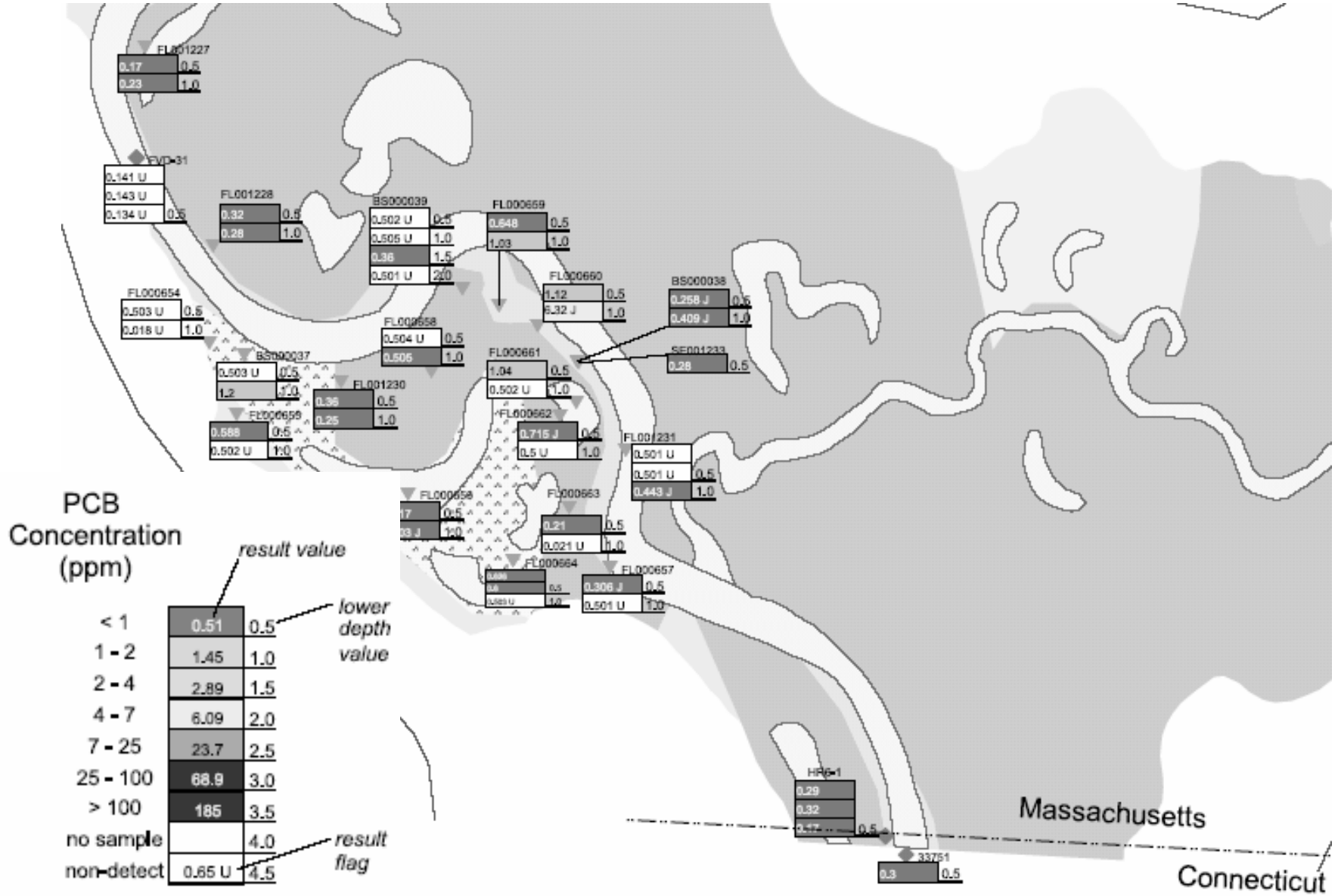
Most of the length of the river and the watershed lie within Connecticut

Lowest Reach of the Housatonic R in MA

showing sediment samples and land use types – taken from the risk assessment



Selected sediment sample results reach 9 rest of river

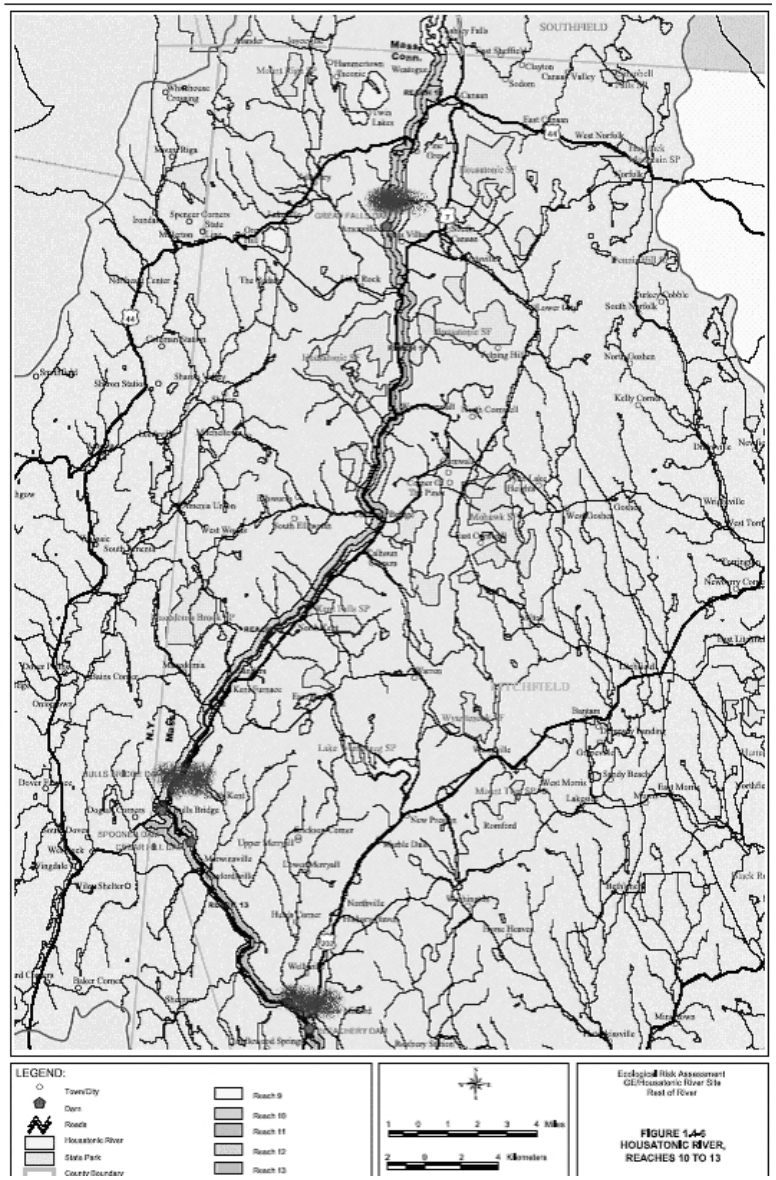


Upper Housatonic River in CT, showing 3 dams sampled

Great Falls Dam – mile 77

Bulls Bridge Dam – mile 49

Blackberry Dam –mile 39



Sediment Samples in Connecticut- all years

Year	Number of Samples
1972	2
1973	3
1974	3
1975	3
1976	3
1977	2
1979	1
1980	146
1986	100
1992	147
1998	78
1999	20
2001	44
Total	552

Data obtained from Weston and submitted in comments

Sediment samples by reach in CT- all years

Reach	Number of Samples
10	80
11	16
12	78
13	41
14	172
15	148
16	17
Total	552

Data obtained from Weston and submitted in comments

Most recent samples – 2001- by depth

Depth	2001 sampling
feet	No. samples per depth
0-.5	23
0-.25	3
0-.45	1
.5-.75	4
.5-1	6
0-.417	1
0-.834	1
2.5-3	1
2-2.5	1
1-1.5	3
Total	44

2 sediment samples taken behind each of the following 3 dams:

Bull's Bridge

Great Falls

Blackberry

Data obtained from Weston and submitted in comments

Conneticut Floodplain Data

Location	Year	Comments
Hartford & Oxford	1993	Flooding (flood gates opened wider at Shepaug Dam and the Stevenson Dam) at least 6 inches over flood stage.
Milford & Harford	1996	Flooding (close Route 7 in Milford)
North Canaan, Ledyard, Westbrook, Middlefield, Norwich	1996	Flooding (rain and icemelting) (flooded basements of homes)
Litchfield County	2000	Flood warnings
Stratford	02/2001	Flooding (businesses flooded)
Bulls Bridge to Derby	03/2003	Flood warnings
Falls Village	03/2003	Minor Flooding (1.1 feet above flood stage)
Gaylordsville	03/2003	Flooding (1.3 feet above flood stage)
Stevenson Dam	03/2003	Flooding (1.5 feet above flood stage)
Ashley Falls, Mass to Cornwall Bridge, Ct.	04/2003	Flood warnings
Gaylordsville	04/2003	7-8.7 feet above flood stage

Toxicity issues

- Non-cancer effects of dioxin-like compounds, as TEQ are not assessed
- Children and fetal effects are likely greater
- Children more susceptible – EPA new guidelines for cancer risk – reviewed by SAB recommend additional safety
- Current health status of general population and specific groups

TEQ’s

- Fails to use or estimate cancer risks from TEQ’s using the latest information on cancer potency as described in the latest version of the Dioxin Reassessment
- No evaluation of the non-cancer health effects of dioxin-like compounds, expressed as TEQ’s.
- Claims that there is no reference dose (RfD) for dioxin

EPA Draft Dioxin Reassessment

Summarizes the effects of dioxin and related compounds on humans and other animals (X=effect occurs)

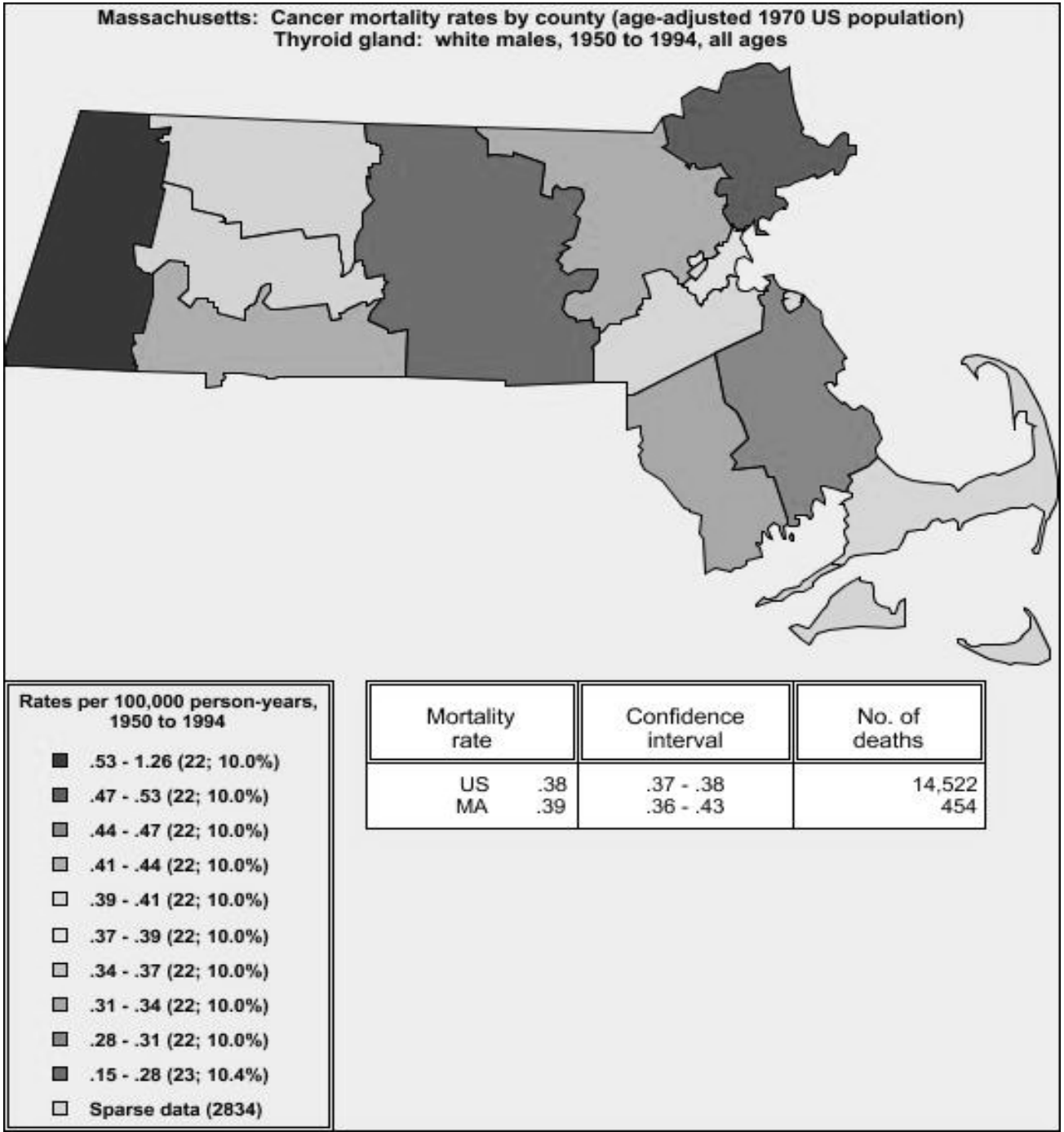
Effect/Outcome	humans	other animals
Ah receptor binding	X	X
Enzyme induction	X	X
Acute lethality	no	X
Wasting syndrome	no data	X
Teratogenesis/fetal toxicity, lethality	X	X
Endocrine	X	X
Immunotoxicity	X	X
Carcinogenicity	X	X
Neurotoxicity	X	X
Chloracne	X	X
Porphyria	X	X
Hepatotoxicity	X	X
Edema	no data	X
Testicular atrophy	no data	X
Bone marrow hyperplasia	no data	X

Risk Estimate Issues

- Older CSF for dioxin is used – about 10x greater risk for TCDD-like compounds
- Body burdens are higher in the Housatonic region
- EPA needs to compare fish PCB tissue levels from well studied cases
- Does not specifically address the problem with mixtures
- Did not use a formal weight of evidence (WOE) approach

Cancer mortality

for thyroid gland in MA, by County, 1950-1994, for white males



Mortality rate		Confidence interval	No. of deaths
US	.38	.37 - .38	14,522
MA	.39	.36 - .43	454

Tribal Issues

- EPA ignored the tribal issues in final RA
- Schaghticoke tribe is present as CT recognized tribe
- The RA, work plans call for assessing tribal issues
- There are no results on the tribal exposures, effects, risks or other matters
- Personal communication with the tribe indicates much exposure is omitted

Specific tribal issues

- Foods include:
  - Catfish
  - Squirrel
- Cooking methods– baking catfish in mud from the river
- Use of the river

Uncertainties

- Monte Carlo analysis helps
- Much uncertainty is not quantified
- Omissions are not quantifiable and are not estimated
- Underestimate of risks – all of the major uncertainties resolve without adding conservative factors

Uncertainties- omissions

- Subsistence fish and waterfowl consumption
- Tribal use of the river, watershed
- No agricultural or domestic animals in either the HH or ecological RA
- Few data on waterfowl and many fish
- TEQ’s for non-cancer effects of dioxin-like

Other information to consider

- Research on PCB's and children (Schantz,2003; Stewart et al., 2003) not included in the IRIS RfD
- Breast cancer in Fox River area
- Combinations of exposures- synergies
- Must complete assessment for the Schaghticoke Tribe before finalizing

Conclusions

- HHRA was standard with some new analytical methods
- The omissions make the results not sufficiently protective
- EPA should assume the risks are even greater
- EPA must correct several omissions or deficiencies, but not delay the cleanup